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(54) Hand held spray gun with top mounted paint cup.

(57) A hand held spray gun (25) having a top mounted fluid cup (26) which extends from the rear of a gun body (29) at an angle of 30° + 10° to an axis (37) about which the atomized fluid is discharged. A retainer ring (36) secures a lid (35) on the cup. The lid (35) seals to both the inside and the outside of the cup (26). The double seals reduce the risk of fluid leakage. Preferably, the gun (25) operates with suction feed which is augmented by gravity feed when fluid in the cup (26) is located above a nozzle assembly on the gun. To facilitate cleaning and to allow the gun (25) to spray in an upward direction, the fluid may be sealed in a collapsible closed bag (83) located in the cup (26). With the closed bag (83) and the suction feed, the gun (25) will operate when aimed in all directions. The gun (25) is easily cleaned by forcing solvent from the nozzle assembly (27) back into the bag (83) and disposing of the bag (83) containing any remaining fluid and the used solvent.

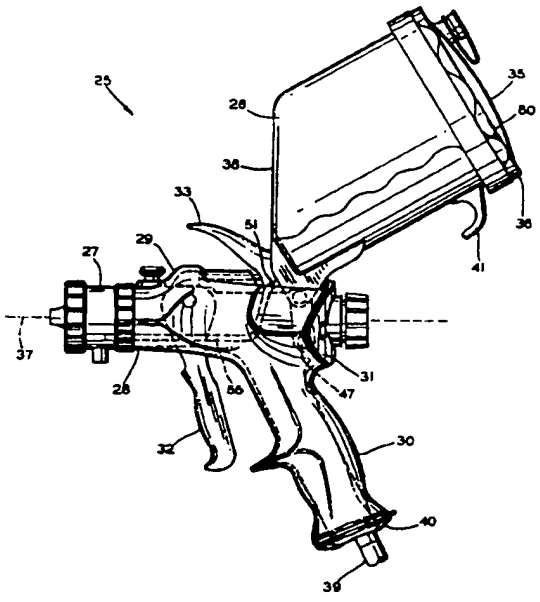

FIG. 3

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This invention relates to fluid spraying and more particularly to an improved hand held spray gun having a top mounted fluid cup for supplying fluid to a nozzle on the spray gun.

Paint is generally delivered to a hand held paint spray gun from one of three sources. For large commercial applications which do not require frequent colour change, the paint may be fed through a hose connected to a remote pressurized paint source. For smaller commercial and non-commercial applications, the paint is generally placed in a cup attached to the gun. Most commonly, the paint cup is suspended below a front end of a body on the gun. The paint is often fed to a nozzle by suction or aspiration induced by atomisation air flow through the gun. For viscous paints and for guns operating on low air pressures, the cup may be pressurized to increase the paint application rate. Finally, a paint cup is sometimes mounted above the gun body for gravity paint feed to the gun nozzle. Whether the cup is suspended below or mounted above the gun body, the cup has traditionally been mounted towards the front end of the body near the nozzle, since the paint must be delivered to the nozzle. In either case, the weight of the paint cup on the front end of the gun adversely affects the balance of the gun and may increase operator fatigue during extended use. Further, when the paint cup is secured above the front end of the gun body, it can adversely affect operator visibility during use.

Typically, when a paint cup has been mounted on the top of a hand held spray gun, it extends upwardly at an angle of at least 45° relative to the spray axis about which paint is discharged. Often the angle is greater to facilitate filling the paint cup while the gun is supported on a stand. When paint is delivered from the have a vent opening in the cup to allow air to enter the cup as paint is consumed. For gravity feed guns, the vent opening normally is located in the centre of th cup lid as a compromise for keeping the vent opening as high as possible when spraying both vertical surfaces and the top of horizontal surfaces. A gravity feed spray gun is not suitable for spraying in a upward direction at the bottom of a horizontal surface, since the paint will not flow by gravity to the gun nozzle and paint can drip from the vent opening in the cup lid. Further, the paint feed tube will not be submerged in the paint in the cup.

When the paint cup is mounted on a hand held gun, paint leakage can be a problem when painting the top of a horizontal surface. In hand held spray guns having conventional paint cups, at least a portion of the cup lid may become submerged under the paint when coating top surfaces, such as a vehicle roof or hood, with a full paint cup. Paint can leak either from a d fective lid seal or from the lid vent and drip on th workpi ce during spraying horizontal surfaces where the gun is held above the surface. Surveys indicate that the most common painting problems are leaks from the cup lid seal and vent when painting top surfaces. If paint drips on the workpiece this can necessitat costly repaints. In order to reduce dripping problems, prior art guns typically seal th paint cup lid either with a s parate r sili nt gask t or with a thin resilient s aling rib. The gasket can leak because it becomes harder as paint is absorb d during us or it becomes worn from use. A thin plastic sealing rib is easily damaged. Further, both conventional cup seals will leak if not properly cleaned.

Top mounted paint cups also can present additional problems for the spray gun operator. In the prior art guns, the cup is screwed onto the top of the spray gun body. The paint cup lid is secured to the cup either by screwing the lid to the cup or by screwing a lid retainer ring to the cup. If any paint reaches the threads, the lid or the lid retainer ring may be difficult to remove. The extra force required to remove the lid may be sufficient to cause the paint cup to unscrew from the spray gun. Also, cleaning the prior art spray guns has been time consuming and expensive. For commercial operations, an expensive gun cleaner is generally required to meet environmental regulations. As much as 8 fluid ounces (0.24 liter), or more, of solvent has been required to clean a typical prior art gun and paint cup and lid. Any reduction in the amount of solvent used can reduce clean up and solvent disposal costs and reduce potential environmental problems.

According to one aspect of the present invention there is provided a hand held spray gun comprising a body, a nozzle assembly mounted to a front end of the body and a handle extending from adjacent a rear end of the body, the gun having an atomization air supply hose connected to the handle, the nozzle assembly atomizing and discharging a fluid about a spray axis during operation, characterised in that it further comprises a fluid cup, means securing the cup to the gun body adjacent the rear end, the cup extending from opposite the gun handle past the rear end of the gun body along an axis forming an angle of from 25° to 35° to the spray axis and a tube connection for delivering fluid from the cup to the nozzle assembly.

Preferably, a disposable collapsible bag is used to line the paint cup. A bushing forms a fluid tight connection between a drain opening in the bag and a fluid outlet from the paint cup. A tool may be used to pierce the opening in the bag and insert the bushing into the formed opening and for inserting the bushing into a paint outlet opening in the bottom of the paint cup. The bag has an open end adjacent the cup lid which can be closed with a integral fluid tight zipper after the bag is filled with paint. When a bag is used, the paint cup is never contaminated with paint and accordingly does not need cleaning after use. If the gun operates with suction paint feed and all trapped air is purged from the closed bag, the gun will operat to spray in an upward direction as well as in the conventional horizontal and downward directions. After spraying is

completed, the atomisation air is turned off to interrupt suction on th paint feed tube. The gun trigger is then squeezed and a squeeze bottle or a syringe is used to force solvent to flow from th spray gun nozzle back through the gun and into the bag. The gun may be cleaned with as little as 2 oz. (0.06 lit r) of solvent. Thus, paint is purged from the gun and the paint feed tube and collected in the closed bag. The bag containing any remaining unused paint and the used solvent is removed from the cup and is easily disposed of. Back flushing paint and solvent into the closed bag appears to conform to existing environmental regulations for enclosed gun cleaners, since the solvent and paint are collected in the closed bag and not dispersed into the atmosphere. Thus, the need for an expensive gun cleaner is eliminated.

An embodiment of the present invention will now b described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a side elevational view of a typical prior art gravity feed hand held paint spray gun oriented for spraying about a horizontal axis for painting vertical surfaces;

Figure 2 is a side elevational view of the spray gun of Figure 1 oriented for painting the top of horizontal surfaces;

Figure 3 is a side elevational view of a hand held paint spray gun with a top mounted paint cup according to the invention, oriented for spraying about a horizontal axis for painting vertical surfaces;

Figure 4 is a side elevational view of the paint cup and lid from the spray gun of Figure 3;

Figure 5 is a side elevational view of the paint cup of Figure 4 with the lid removed;

Figure 6 is a rear elevational view of the paint cup of Figure 4;

Figure 7 is a fragmentary cross sectional view as taken along line 7-7 of Figure 6;

Figure 8 is a fragmentary cross sectional view as taken along line 8-8 of Figure 6;

Figure 9 is a side elevational view of a bag for lining the paint cup;

Figure 10 is an enlarged cross sectional view through a bushing for securing the bag of Figure 9 to the paint cup;

Figure 11 is an enlarged view of the paint cup of Figure 4 and showing in dashed lines a partially filled liner bag inside the paint cup; and

Figure 12 is a side elevational view of a tool for piercing a hole in the bag of Figure 9, inserting a bushing as shown in cross section in the pierced hole and s curing the bushing to the paint cup.

Referring first to Figures 1 and 2 of the drawings, a prior art hand held paint spray gun 10 is illustrated comprising a body 11, a nozzle assembly 12 secured to a front end 13 of th body 11, and a handle 14 depending from a rear end 15 of the body 11. A trigger 16 is pivotally secured to the body 11 for manually operating the gun 10. A top mounted, gravity feed paint cup 17 is secured to the body 11 near th front end 13 for delivering paint to the nozzle assembly 12. The paint cup 17 is closed by a lid 18 which is screwed onto the cup 17. A vent 19 is located in the center of the lid 18. The vent is closed by a removable vented cap 20 to reduce the likelihood of dripping while permitting easy cleaning of the vent 19.

In operation the spray gun 10 discharges atomized paint about a spray axis 21. In the typical prior art gravity feed spray gun 10, the paint cup 17 is screwed into the spray gun body 11 to extend at an angle of at least 45° to the spray axis 21. Prior to use, the gun 10 is supported on a stand (not shown) which holds the gun 10 with the paint cup 17 vertical. The paint cup 17 is filled and the lid 18 is secured to the cup 17. When the cup 17 is filled to the maximum and the gun 10 is positioned as in Figure 1 with the spray axis 21 horizontal for painting side surfaces, the paint will have an upper surface level 22 which is located slightly below the vent 19. When the gun is rotated through 90° so that the axis 22 is vertical for painting top surfaces as shown in Figure 2, the paint surface level 22 in the cup 17 will also be slightly below the vent 19. Preferably, the gun 10 is oriented during use so that the axis 21 is perpendicular to the surface being painted. It will be seen in Figure 1 that if the gun 10 is tipped slightly for spraying in an upward direction, the vent 19 will become submerged under the paint surface level 22. Similarly, if the gun 10 in Figure 2 is tipped past the vertical, the vent 19 also will become submerged under the paint surface level 22. In either case, the paint will eventually leak from the vent 19. The cap 20 forms a small chamber (not shown) with the vent 19 to delay any dripping. If the gun 10 is returned to a position wherein the vent 19 is no longer submerged, prior to dripping from the vented cap 20 the paint will flow from the chamber back into the cup 17. It will be seen in Figures 1 and 2 that a substantial portion of the lid 18 may be located below the paint surface level 22 when the cup 17 is full. If the seal between the cup 17 and the lid 18 fails, paint will leak between the lid 18 and the cup 17 and drip. When the gun is in the Figure 2 position for spraying top surfaces, the leaking paint can drip on the surface being painted, resulting in costly repairs.

Turning to Figure 3, a hand held paint spray gun 25 having a top mounted paint cup 26 according to the invention is illustrated. The spray gun 25 has a nozzle assembly 27 secured to a front end 28 of a body 29 and a handle 30 depending from adjacent a rear end 31 of the body 29. A main trigg r 32 is pivotally secured to the body 29 for operating th spray gun 25 while the gun 25 is held by the handle 30. Optionally, the gun 25 may have an auxiliary trigger 33 pivotally mounted on the body 29 to xtend above the body 29. When spraying top surfaces of a workpiece not

shown), the operator may grasp th gun body 29 and operate the gun with the auxiliary trigger 33.

Details of the paint cup 26 are shown in Figures 3 to 6. Th cup 26 may be formed from a strong light weight solvent resistant plastic material. Preferably, the cup is form d from "Delrin" manufactur d by Dupont, which does not absorb paint like typical nylon paint cups and therefore is easier to clean. The paint cup 26 has an open end 34 (Figure 5) which during use of the spray gun 25 is closed by a lid 35. The lid 35 is releasably secured to the cup 26 by a retainer ring 36, which is described in greater detail below. The nozzle assembly 27 on the spray gun 25 atomizes and discharges paint about a spray axis 37. The paint cup 26 is generally cylindrical and extends above and to the rear of the gun body 29 at an angle of 30° + 5° and preferably at an angle of 30° to the spray axis 37. The cup 26 has an oblique front 38 which extends substantially perpendicular to the spray axis 37. The cup location reduces the forward weight on the gun to improve maneuverability and operator visibility over prior art guns having a top mounted cup attached to the front of the gun body. Further, the weight of the cup 26 opposes the weight of an air hose 39 secured to a lower end 40 of the gun handle 30 to improve the balance of the gun 25. To facilitate filling the cup 26 and supporting the gun 25 when not in use, a hook 41 is formed at a lower rear portion of the cup 26. When the gun 25 is hung by a hook 41, the cup 26 will be substantially vertically oriented so that the lid 35 and the open cup end 34 are not submerged under the paint.

A lower front corner 42 of the paint cup 26 is secured to the spray gun body 29 by a pair of spaced brackets 43 and 44. As shown in Figures 6 and 7, a pin 45 projects from the bracket 43 towards the bracket 44 and a pin 46 projects from the bracket 44 towards the bracket 43. The pins 45 and 46 are coaxially aligned. As shown in Figure 7, the pin 45 may have a c nter split 48, while the pin 46 has a similar shape. The bracket 44 has an extended end 49. The brackets 43 and 44 straddle the rear end 31 of the spray gun body. The pins 45 and 46 engage openings (not shown) in the gun body 29 formed in the ends of pivots (not shown) for the auxiliary trigger 33. A screw or bolt 47 is passed through a hole 50 in the extended bracket end 49 for securing the cup 26 to the gun body 29. Construction details of the spray gun body and of the upper trigger pivots are shown, for example, in United States patent application Serial No. 08/048277, the disclosure of which is incorporated herein. Between the two pins 45 and 46 and the screw in the bracket hole 50, a three point connection is made between the paint cup 26 and the gun body 29 to rigidly secur the paint cup 26 to the gun body 29. Th split 48 in the pins 45 and 46 permits the resili nt pins to be slightly compressed in the complementary gun body holes for a tight fit.

As best shown in Figures 3, 5 and 11, a nipple 51 extends from a lower front corner 42 of th paint cup 26. Th nipple 51 has a central opening 53 which communicates with an interior 54 of the paint cup 26. The nipple 51 is connected through a tube 55 (Figure 3) to deliver paint from the cup 26 to the gun nozzle ass mbly 27. Pr ferably, the tube 55 is made of polytetrafluoroethylene (Teflon) which is highly resistant to paint solvents and is easily cleaned because of its low adhesion for paint. Although the paint may be delivered from the cup 26 to the nozzle assembly 27 strictly through gravity feed, it is preferable that the nozzle assembly create a suction to draw paint through the tube 55. The suction feed will be further enhanced by gravity, so long as the gun 25 is oriented with paint in the cup 26 above the nozzle assembly 27.

Details of the open cup end 34, the lid 35 and the lid retainer ring 36 are shown in Figure 8. The cup 26 has a tapered exterior annular surface 58 and a tapered interior annular surface 59 at the open end 34. The surfaces 58 and 59 are preferably at an angle of 10° + 5° relative to a longitudinal axis 60 through the cup 26. The surfaces 58 and 59 seal, respectively, against complementary tapered annular surfaces 61 and 62 formed in a groove 63 in the lid 35. The two surfaces 58 and 59 form a tongue at the open cup end 34 which engages the lid groove 63 in a manner such that each surface 58 and 59 forms a separate seal. With double seals, there is less likelihood of leakage between the cup 26 and the lid 35, since both seals would have to fail. If paint is not properly cleaned off of the cup surfaces 58 and 59 or from the lid groove 63, the tongue and groove tend to be self cleaning as they are rotated or pushed together. Further, the tongue and groove are larger than the prior art sealing ribs, so they are easier to clean and resist damage better.

An improved vent 64 is formed in the lid 35, as best illustrated in the sectional view of Figure 8. The vent 64 is located off center on the lid 35 towards the uppermost portion of the cup 26 when the cup 26 is oriented as in Figures 3, 4 and 6. The vent generally consists of a tubular section 65 integral with the lid 35 and having a bottom 66. The tubular section 65 is closed by a removable cap 67. The cap 67 is pressed onto the tubular section 65 and when removed from the tubular section 65 is retained by a tether 68. The tubular section 65, the bottom 66 and the cap 67 cooperate to form a chamber 69. A small central vent opening 70 is formed through the cap. The cap 67 and the tubular section 65 are similar to those used in prior art paint cup vents. However, the prior art vents had only a single central vent opening through the bottom 66. According to th invention, two vent openings 71 and 72 are formed in the bottom 66. Th v nt opening 71 is located to be at the bottom of the chamber 69 when the spray gun 25 is oriented with the

spray axis 37 horizontal and th vent opening 72 is located to be at the bottom of the chamber 69 when the spray gun 25 is oriented with the spray axis 37 vertical. Thus, th two vent openings allow paint to drain from the chamber 69 ov r a greater range of positions of th spray gun 25. At least the portion of the openings 71 and 72 at an inner side 73 of the lid 35 ar chamfered. The chamfers prevent the paint from "skinning over" and clogging the openings 71 and 72. Depending on the thickness of the bottom 66, the vent openings 71 and 72 may be straight holes which are chamfered over their entire length, as shown.

Figure 8 shows details of the retainer ring 36 and its operation for securing the cap 35 to the paint cup 26. The retainer ring 36 has an upper lip 74 having a smaller inner diameter than the diameter of the lid 35. A pair of diametrically opposing resilient tabs 75 on the lid 35 engage the lip 74 for retaining the ring 36 on the lid 35. The tabs 75 keep the lid 35 and the retainer ring 36 together as one piece during use, while permitting easy separation of the retainer ring 36 from the lid 35 for cleaning. The ring 36 has a generally tubular side 76 having an interior sized to fit over the open cup end 34. Four bayonets 77 are spaced around and project radially from the cup 26 immediately below the tapered exterior surface 58. The interior of the retainer ring 36 is formed with recesses 78 which receive the bayonets 77 when the ring 36 is positioned over the cup end 34. After the retainer ring 36 is positioned on the cup end 34, it is rotated and the bayonets 77 move into angled slots 79. The bayonets 77 and the slots 79 cooperate like short screw threads for securing the retainer ring 36 onto the cup 35 and for forcing the tapered cup surfaces 58 and 59 to seal against the tapered lid groove surfaces 61 and 62, respectively. Preferably, the bayonets 77 have an elongated cross section and are disposed at the same angle as the slots 79 for increased strength. The retainer ring 36 may have a textured or rippled exterior surface 80 to facilitate grasping when securing the retainer ring 36 to or removing the retainer ring 36 from the cup 26.

The paint cup 26 may be provided with graduations 82 (Figure 5) for indicating the amount of paint in the cup 26 when the cup axis 60 is vertically oriented. After the spraying of a particular paint is completed, it is necessary to clean paint from the gun 25 and the paint cup 26. This is accomplished by flushing paint solvent through the cup 26 and the gun 25. To facilitate cleaning, the cup 26 may be lined with a disposable, flexible bag 83, as shown in Figures 9 - 11. The bag 83 is formed from a paint solvent resistant plastics material and has an integral leak-proof zipper closure 84. A small opening 85 is formed at the bottom of the bag 83. A bushing 86 is inserted into the opening 85 for s curing the bag 83 to the opening 53 in the cup nipple 51. As shown in Figur 10 the bushing 86 is generally tubular and has an end 87 larger than the bag opening 85. The bag opening 85 must be stretched to pass the bushing end 87. The tension around th bag opening 85 seals the bag 83 to the bushing 86. An enlarged diameter radial flang 88 on the bushing 86 pr vents th entir bushing 86 from passing through the bag opening 85. The bushing 86 also has an end 89 which is of a larger diameter for grasping when securing the bag 83 to and removing the bag 83 from the paint cup 26. Preferably, a number of slits 90 are formed in the end 89 to facilitate paint flow from the bag to a central passage 91 through the bushing 86. The central passage 91 is stepped to have a larger diameter in the end 89 than in the end 87. Although a separate bushing 86 is illustrated, it will be appreciated that the bushing 86 may be molded as an integral part of the bag 83.

The opening 85 may be formed in the bag 83 at the time of manufacture. However, a tool 93 as shown in Figure 12 may be used to pierce the hole 85 in the bag 83, to install the bushing 86 in the bag 83 and to facilitate installing the bag 83 in the paint cup 26. The tool 93 has a sharp end 94 sized for piercing the small hole 85 in the bag 83. A conical section 95 is located adjacent the end 94. The conical section 95 connects the end 94 with a straight section 96 which has a diameter for passing through the passage 91 in the bushing 86. The straight section 96 is connected to an elongated larger diameter end 97 which forms a handle for the tool 93. The straight section 96 has a diameter which is received by the portion of the bushing passage 91 in the end 89, but is larger than the portion of the passage 91 in the bushing end 87. In use, a bushing 86 is positioned on the tool 93 as shown in Figure 12. The tool end 94 is then used to pierce the hole 85 in the bag 83 from the inside of the bag. As the tool 93 is forced through the pierced hole 85, the bag stretches and passes over the conical section 95, over the straight section 96 and onto the bushing end 87. Because the bag is stretched over the bushing end 87, a seal is formed. While the tool 93 remains in the bushing 86, the bag 83 is placed in the paint cup 26, the tool end 94 is inserted into the nipple opening 53 and the tool handle 97 is pushed to seat the bushing 86 in the tapered opening 53. The tool 93 is then withdrawn from the bag 83 and the spray gun is ready for use.

Figure 11 shows a bag 83 secured inside of the paint cup 26 by means of a bushing 86. The bushing end 87 is sized to be received by and seal to the nipple passage 51. In use, the gun operator secures a bag 83 inside of the cup 26 and opens the bag closure 84. A desired quantity of paint is poured into the bag 83, the closure 84 is seal d and the lid 35 is secured to the cup 26. Since the paint is retained in the bag, only the nipple passage 51, the paint tube 55 and th paint passages in the gun nozzle assembly 27 will be exposed to the paint and require cleaning after use. The operator then points the gun in an upward direction

with the spray axis 37 vertical and triggers the gun. Suction created by the flow of atomization air through the gun 25 aspirates any trapped air from the bag 83. The bag 83 will collapse as air and paint are drawn from the bag 83. After all air is removed from th bag 83, the gun 25 will discharge paint, regardless of the direction in which the gun 25 is aimed. Thus, with suction feed and the use of a sealed collapsible bag 83, the gun can spray in an upward direction to paint the bottom of a horizontal surface. Prior art hand held spray guns could only spray when the gun was aimed in a direction which kept a paint feed tube submerged below the paint surface.

The spray gun 25 is easily cleaned with a minimum amount of solvent when the cup 26 is lined with a sealed bag 83. After spraying, any remaining paint may be left in the bag 83. Atomization air to the gun 25 is turned off to interrupt suction on the paint feed tube 55 when the gun 25 is triggered. Solvent is placed either in a syringe (not shown) or in a plastic squeeze bottle (not shown). The outlet from the syringe or squeeze bottle is positioned against an air cap and over a paint discharge orifice (not shown) on the nozzle assembly 27, the gun 25 is triggered, and the solvent is discharged from the syringe or bottle. Solvent will then flow over the air cap surface and back through the nozzle assembly 27, the tube 55, the nipple opening 53 and into the bag 83. The solvent removes all paint from the spray gun and the dirty solvent is collected in the closed bag 83. The sealed bag containing the paint and used solvent is then removed from the gun for disposal. The flange 88 on the bushing 86 keeps the bushing 86 in the bag 83 when the bag 83 is pulled from the paint cup 26. Paint is flushed from the gun 25 with a minimum quantity of solvent. For example, a gun according to the invention has been cleaned with only 2 oz. (0.06 liter) of solvent, while a prior art gun typically requires 8 oz. (0.24 liter) or more of solvent for cleaning. Further, since the solvent is trapped in the bag 83 and not discharged into the atmosphere, it appears that the bag 83 will meet environmental regulations without the need for an expensive gun cleaner.

Claims

1. A hand held spray gun (25) comprising a body (20), a nozzle assembly (27) mounted to a front end of the body (29) and a handle (30) extending from adjacent a rear end of the body, the gun (25) having an atomization air supply hose (39) connected to the handle (30), the nozzle assembly (27) atomizing and discharging a fluid about a spray axis (37) during operation, characterised in that it furth r comprises a fluid cup (26), means securing the cup to the gun body (29) adjacent the rear end, the cup (26) extending from oppo- site the gun handl (30) past th rear nd of the gun body (29) along an axis forming an angle of from 25° to 35° to the spray axis (37) and a tube (51) connection for delivering fluid from the cup to the nozzle assembly.

2. A hand held spray gun (25) as claimed in Claim 1, characterised in that the cup axis extends at an angle of substantially 30° to the spray axis (37).

3. A hand held spray gun (25) as claimed in Claim 1, characterised in that the cup (26) has an annular open end (34), a tapered annular exterior surface (58) adjacent the open end and a tapered annular interior surface (59) adjacent the open end, the tapered exterior and interior surfaces forming oppositely directed angles of from 5° to 15° to the cup axis (60), a lid (35) having an annular groove (63) for receiving the open cup end (34), a retainer ring (36) engaging a perimeter of the lid (35), means for releasably connecting the retained ring (36) to the cup to secure the lid over the open cup end, the lid (35) separately sealing to both the exterior surface and the interior surface of the cup when the lid is secured to the cup, and a vent (64) in the lid.

4. A hand held spray gun (25), as claimed in Claim 3, characterised in that the lid groove (63) has two spaced tapered annular surfaces (61, 62) which are complementary to and engage the exterior (58) and interior (59) cup surfaces.

5. A hand held spray gun (25) as claimed in Claim 3, characterised in that the vent (64) comprises a tubular projection (65) extending from the lid, the projection having an interior closed at one end by the lid (35) and open at an opposite end, a removable cap (67) closing the open projection end, a vent opening (70) centered in the cap (67), and a pair of spaced vent openings (71, 72) in the cap (67) between the projection interior and the interior of the paint cup, the spaced vent openings (71, 72) being located wherein any paint in the projection interior drains through one of the spaced openings into the cup (26) when the gun (25) is oriented with the spray axis (37) horizontal and such paint drains through the other of the spaced openings into the cup (26) when the gun is directed downwardly with the spray axis (37) vertical.

6. A hand held spray gun (25) as claimed in Claim 5, characterised in that the lid (35) has a surface facing th int rior of the cup (26) when the lid (35) is secured to the cup, and wherein th spaced openings (71, 72) are chamfered at the lid surface.

7. A hand held spray gun (25) as claimed in Claim 1, characterised in that the means s curing the cup (26) to the gun body (29) adjacent the rear end comprises first and second spaced brackets (43, 44), a first pin (45) proj cting from the first bracket (43) towards the s cond bracket (44), a second pin (46) projecting from the s cond bracket (44) towards the first bracket (43), the pins engaging holes on the gun body (29), the first bracket (43) having an end extending past the first pin (45), and means for securing the extended first bracket end (43) to the gun body (29).

8. A hand held spray gun (25) as claimed in Claim 1, characterised in that fluid to be sprayed flows to the gun through suction feed, and further including a disposable flexible bag (83), the bag having an opening adjacent one end and a sealed zipper closure (84) adjacent an opposite end, means (86) connecting the bag opening in fluid communication to deliver fluid to the tube, the bag (83) collapsing as fluid is delivered from the bag (83) to the gun (25).

9. A hand held suction feed paint spray gun in combination with a paint cup (26) mounted on the spray gun, including a tube (55) for delivering paint from the paint cup (26) to the spray gun (25), a disposable flexible bag (83) located in the paint cup, the bag having an opening (85) adjacent one end and a sealed zipper closure (84) adjacent an opposite end, means connecting the bag opening in fluid communication to deliver paint to the tube (55), the bag (83) collapsing as paint is delivered from the bag to the gun (25).

10. A hand held suction feed paint spray gun (25) as claimed in Claim 9, characterised in that the connecting means comprises a bushing (86) having an elongated diameter flange (88) located in the bag (83), the flange (88) retaining the bushing (86) in the bag opening (85).

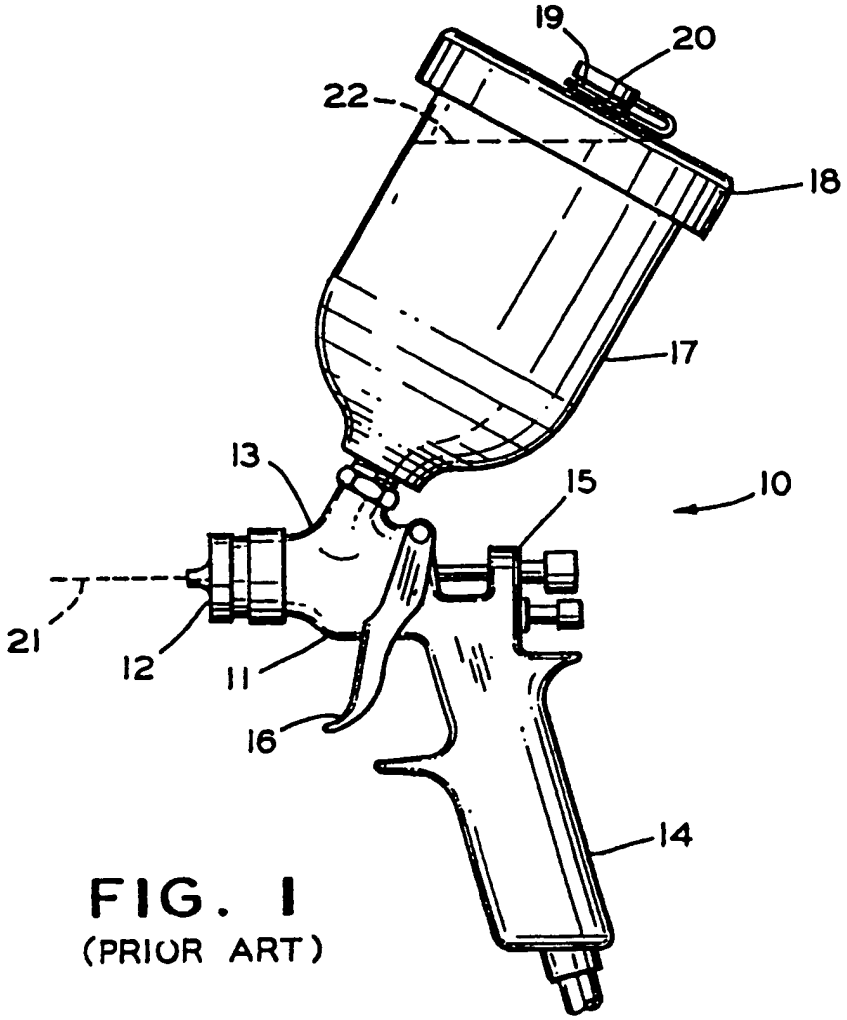

FIG. 1
(PRIOR ART)

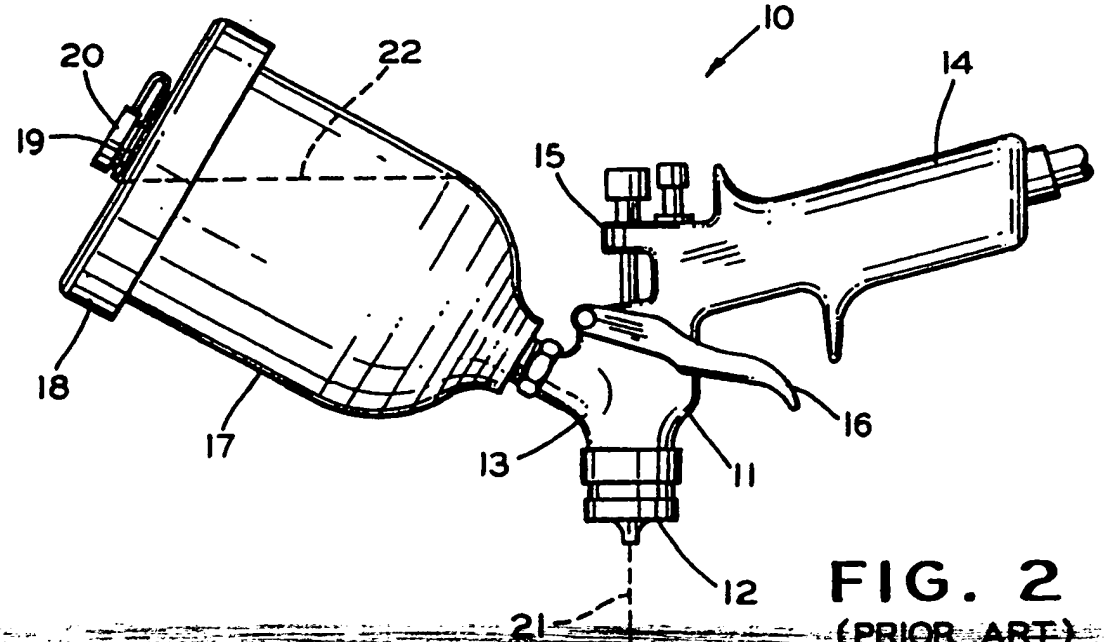

FIG. 2
(PRIOR ART)

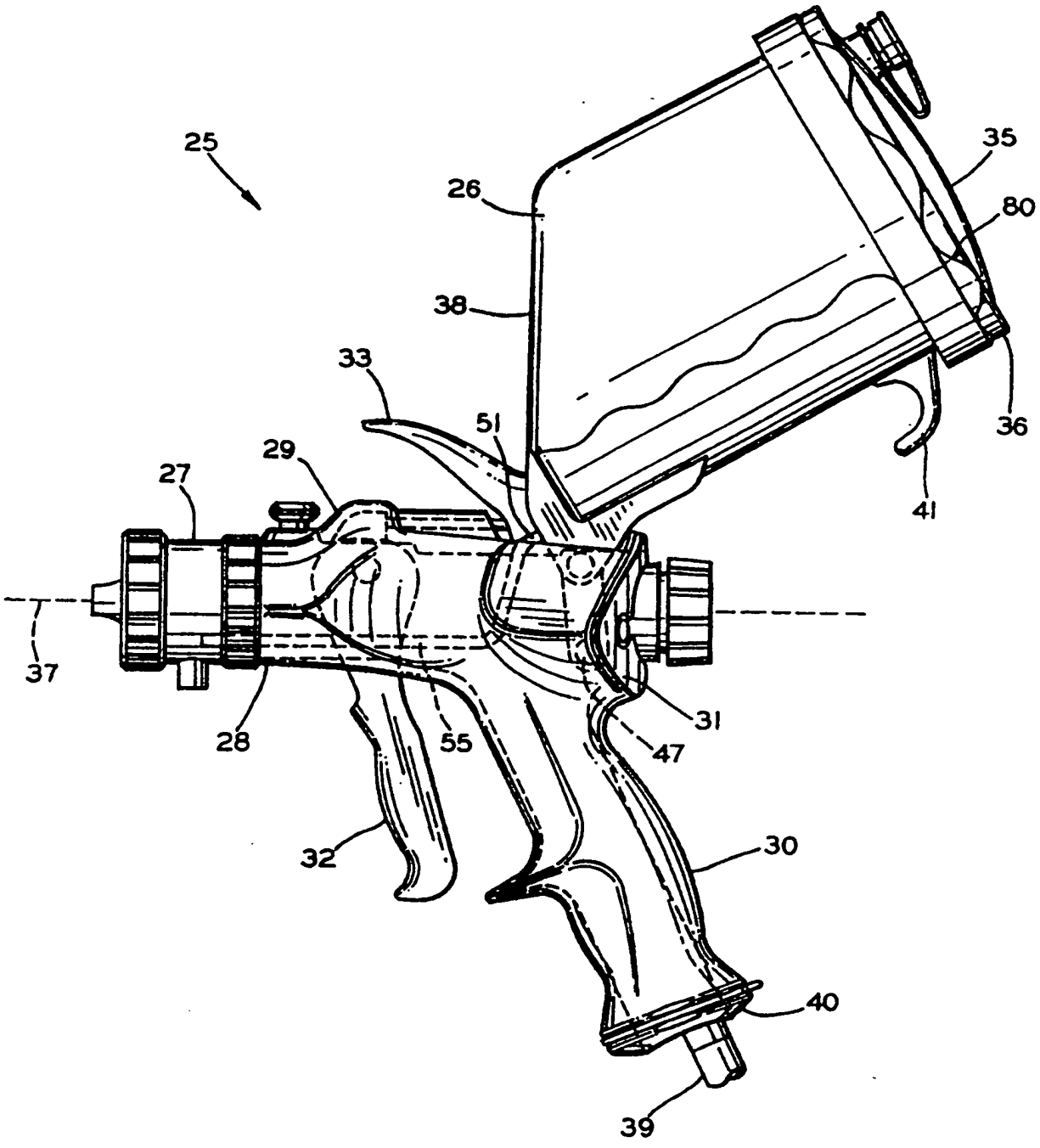

FIG. 3

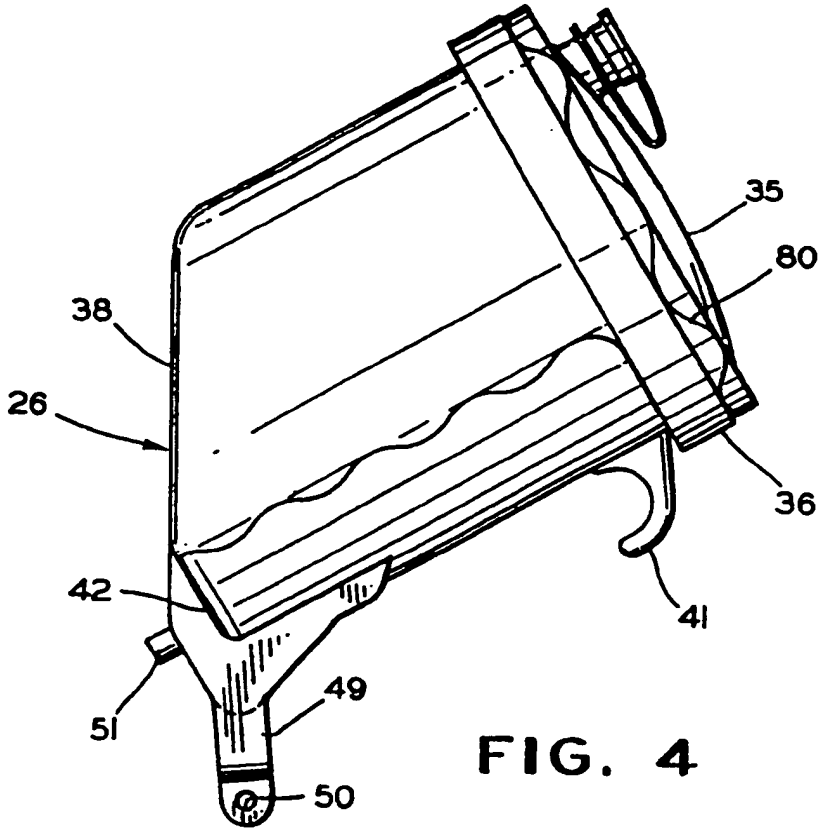

FIG. 4

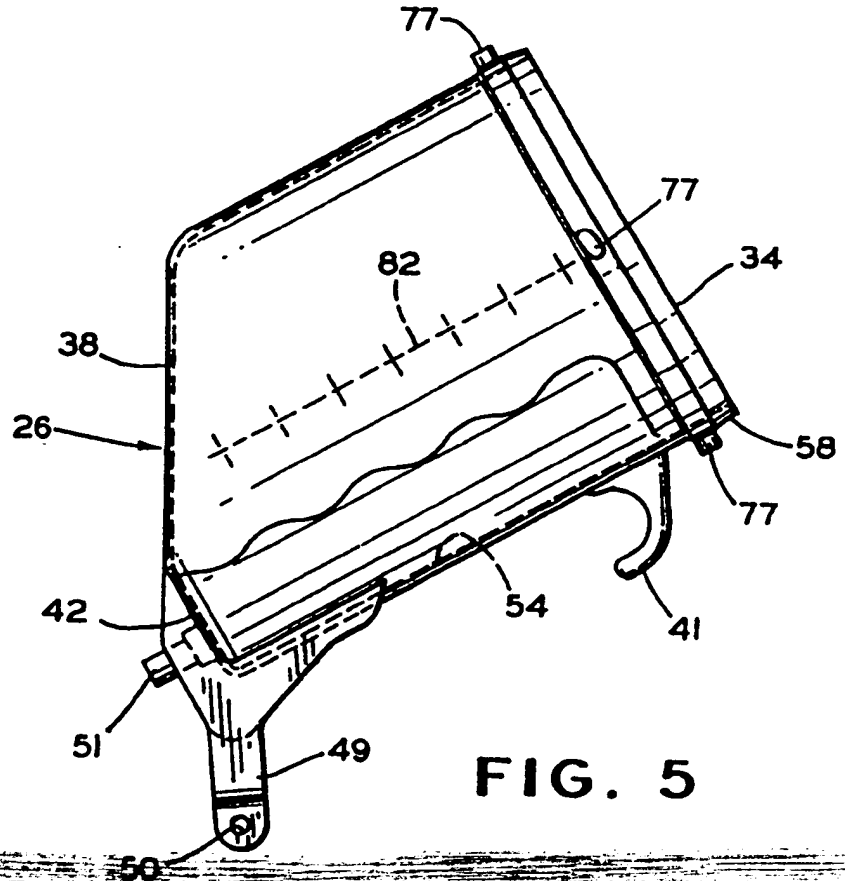

FIG. 5

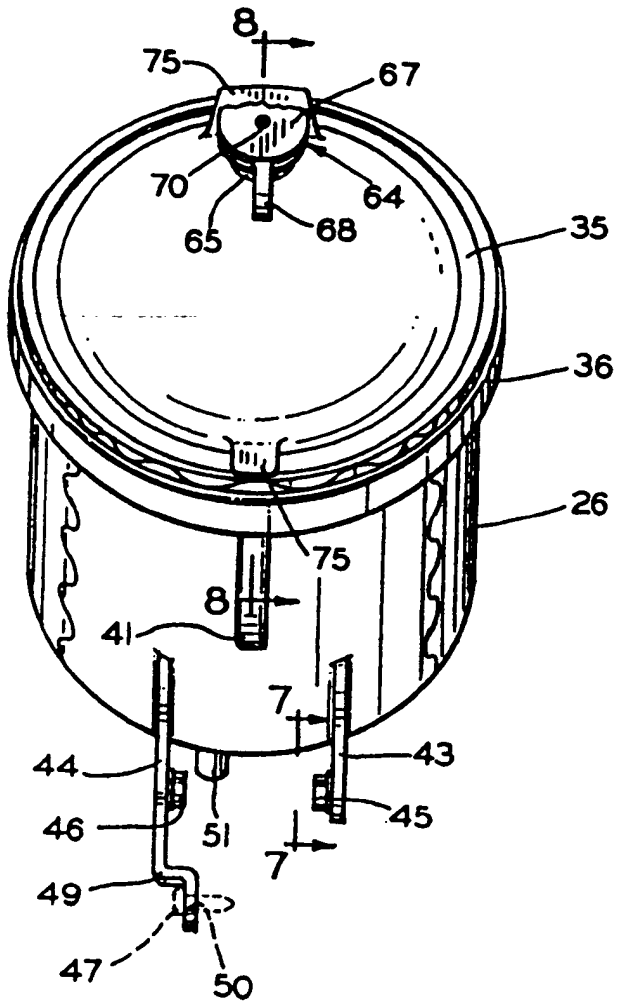
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FIG. 6

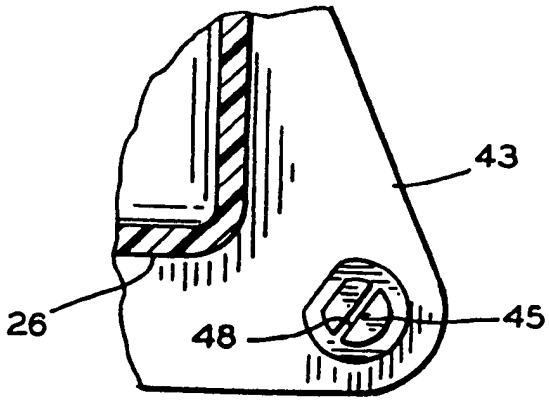
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FIG. 7

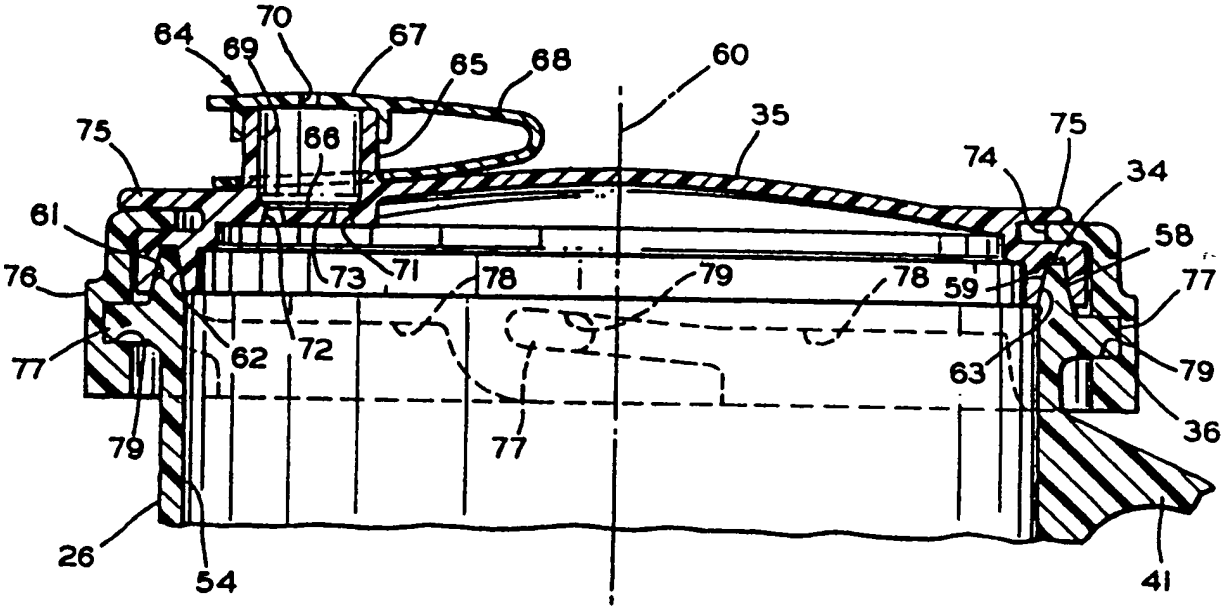

FIG. 8

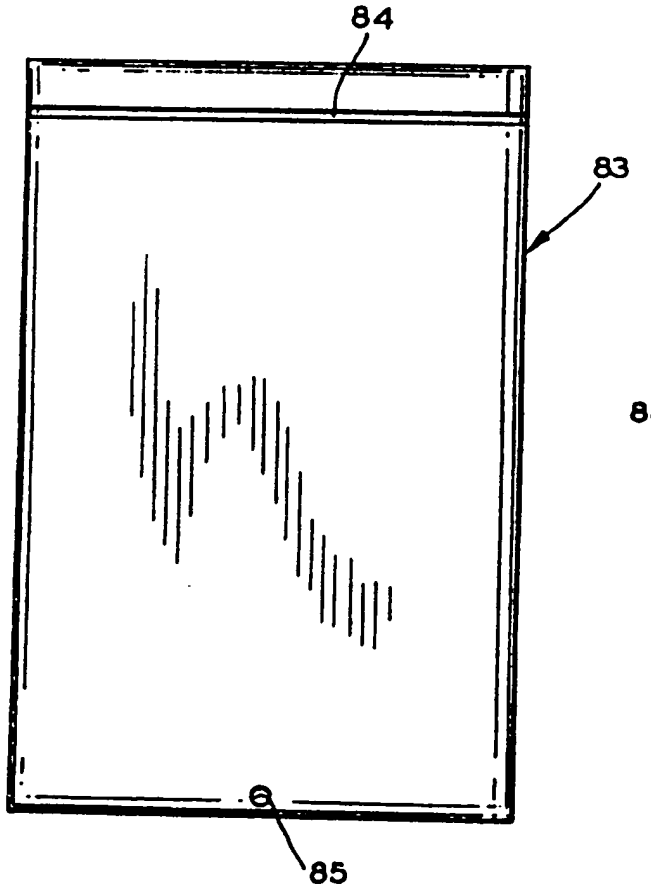

FIG. 9

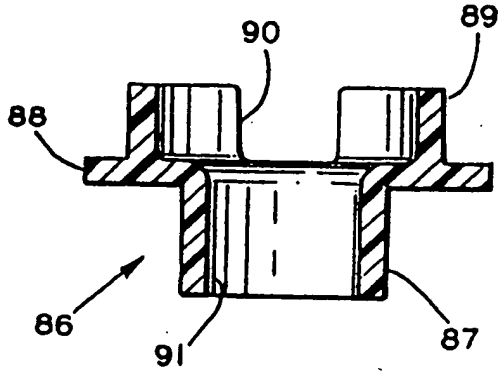

FIG. 10

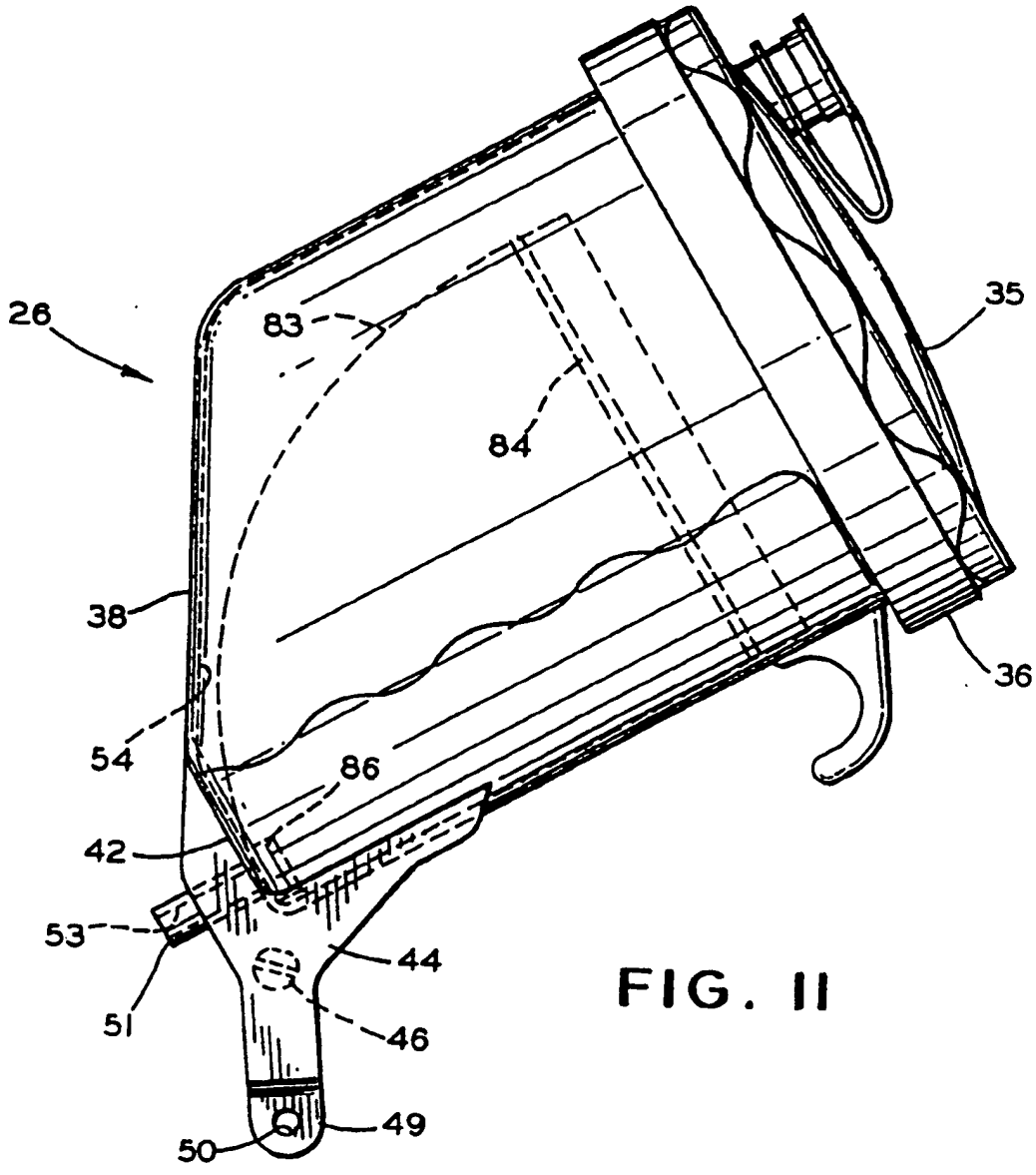
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FIG. 11

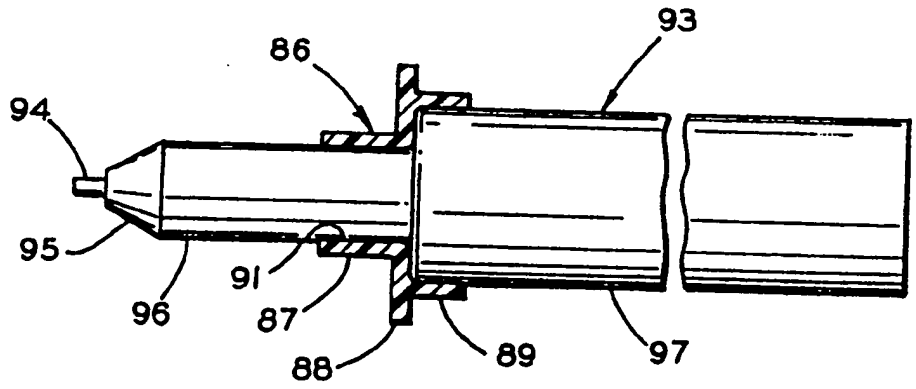
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FIG. 12